CLAIMS

1. A process for the production of $ZnCl_2$ from a Zn bearing primary and/or secondary material, comprising the steps of:

reacting the Zn bearing material with a chlorinating agent to convert metals present in the Zn bearing material into chlorides and vaporising the volatile components of the reaction product at a temperature between the melting point of said reaction product and the boiling point of $ZnCl_2$, thereby recovering a Zn rich chlorinated melt,

converting metal impurities which are present in said Zn rich chlorinated melt into insoluble oxides by adding a metal oxide to the melt, and subsequently

distilling $ZnCl_2$ from the Zn rich chlorinated melt, thereby recovering purified $ZnCl_2$ and a Zn-depleted chlorinated melt.

2. The process of claim 1, wherein the chlorinating agent is Cl_2.

3. The process of claim 1, wherein the metal oxide is ZnO.

4. The process of claim 1, wherein, during the converting step, an oxidising agent is added to the melt.

5. The process of claim 4, wherein the oxidising agent is Cl_2.

6. The process of claim 1, further comprising separating the insoluble oxides from the Zn-depleted chlorinated melt after the step of distilling $ZnCl_2$.

7. The process of claim 1, wherein during the step of reacting the Zn bearing material with a chlorinating agent the addition of said chlorinating agent is controlled so as to convert substantially all the Fe present in the Zn bearing material into $FeCl_2$, and further comprising the step of, after having recovered the Zn rich chlorinated melt and before converting:

volatilising Fe as Fe(III) chloride by adding an oxidising chlorinating agent to the melt at a temperature between 400 and 730 °C.

8. The process of claim 7, wherein the oxidising chlorinating agent is Cl_2.

9. The process of claim 7, further comprising the step of producing purified Fe(III) chloride by rectifying Fe(III) chloride using a liquid reflux carrier.

10. The process of claim 9, wherein purified $ZnCl_2$ from the step of distilling $ZnCl_2$ is fed as a liquid reflux carrier in the step of rectifying Fe(III) chloride.

11. The process of claim 1, wherein the step of distilling $ZnCl_2$ comprises the steps of:

volatilising $ZnCl_2$ and other less volatile metal chlorides, thereby obtaining the Zn-depleted chlorinated melt and a $ZnCl_2$-rich gaseous phase, and

rectifying the $ZnCl_2$-rich gaseous phase, thereby obtaining the purified $ZnCl_2$ and metal chlorides less volatile than $ZnCl_2$.

12. The process of claim 9, wherein:

the step of distilling $ZnCl_2$ comprises the steps of:

volatilising $ZnCl_2$ and other less volatile metal chlorides, thereby obtaining the Zn-depleted chlorinated melt and a $ZnCl_2$-rich gaseous phase, and

rectifying the $ZnCl_2$-rich gaseous phase, thereby obtaining the purified $ZnCl_2$ and metal chlorides less volatile than $ZnCl_2$, and

either one or both of purified $ZnCl_2$ and metal chlorides less volatile than $ZnCl_2$ from the step of rectifying the Zn-rich gaseous phase, is fed as a liquid reflux carrier in the step of rectifying Fe(III) chloride.

13. A process for the production of metallic Zn and Cl_2 comprising the steps of:

reacting the Zn bearing material with a chlorinating agent to convert metals present in the Zn bearing material into chlorides and vaporising the volatile components of the reaction product at a temperature between the melting point of said reaction product and the boiling point of $ZnCl_2$, thereby recovering a Zn rich chlorinated melt,

converting metal impurities which are present in said Zn rich chlorinated melt into insoluble oxides by adding a metal oxide to the melt,

distilling $ZnCl_2$ from the Zn rich chlorinated melt, thereby recovering purified $ZnCl_2$ and a Zn-depleted chlorinated melt, and

subjecting the purified $ZnCl_2$ to dry electrolysis to produce metallic Zn and Cl_2.

14. The process of claim 13, wherein Cl_2 produced in the electrolysis step is recycled as chlorinating agent to the step of reacting the Zn bearing material with a chlorinating agent.

15. The process of claim 13, wherein, during the converting step, an oxidising agent is added to the melt and wherein Cl_2 produced in the electrolysis step is recycled as oxidising agent to the step of converting.

16. The process of claim 13, wherein during the step of reacting the Zn bearing material with a chlorinating agent the addition of said chlorinating agent is controlled so as to convert substantially all the Fe present in the Zn bearing material into $FeCl_2$, and further comprising the step of, after having recovered the Zn rich chlorinated melt and before converting:

volatilising Fe as Fe(III) chloride by adding an oxidising chlorinating agent to the melt at a temperature between 400 and 730 °C; and

wherein Cl_2 produced in the electrolysis step is recycled as oxidising chlorinating agent to the step of volatilising Fe as Fe(III) chloride.

17. The process of claim 1, further comprising the step of separating metal values present in the Zn-depleted chlorinated melt, thereby obtaining a metal-depleted chlorinated melt.

18. The process of claim 17, wherein the metal-depleted chlorinated melt is recycled for use as a solvent in the step of reacting the Zn bearing material with a chlorinating agent.